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The Young and the Restless? Age as a Moderator of the Association Between Sexual Desire and Sexual Distress in Women

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The authors aimed to assess the degree to which age moderates the association between sexual desire and sexual distress in women. The authors combined 4 independent data sets that yielded a total sample of 771 women (M age = 27.76, SD age = 9.64) who had completed the Sexual Satisfaction Scale for Women and the Female Sexual Function Index. Desire interacted with age quadratically in predicting personal and relational sexual distress such that desire was more strongly associated with distress for younger women as compared with middle-aged and older women. Age is an important moderator of the association between sexual functioning and sexual distress in women. Research and clinical implications are discussed.

Low sexual desire is the most commonly reported difficulty with female sexual functioning in the United States. Recent estimates suggest that about 64% of women report low levels of sexual desire in the past year¹ (Hayes, Bennet, Fairley, & Dennerstein, 2006). In many cases, this low sexual desire is associated with pronounced distress and/or interpersonal difficulty. The presence of low desire and personal and/or interpersonal distress constitute hypoactive sexual desire disorder, as defined by the American Psychiatric Association (2000). However, recent research has highlighted the fact that

¹ Participants' age ranged from 18 to 96.

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not all instances of low sexual desire are associated with significant distress (Bancroft, Loftus, & Long, 2003; Hayes, Dennerstein, Bennet, & Fairley, 2008; Oberg & Fugl-Meyer, 2005; Shifren, Monz, Russo, Segreti, & Johanes, 2008), and some studies have identified moderators of the association between desire and distress. For example, relational intimacy (Stephenson & Meston, 2010b) and a history of childhood sexual abuse (Stephenson, Pallatto, & Meston, *in press*) have been found to moderate the association between sexual desire and sexual distress.

Recently, Rosen and colleagues (Rosen et al., 2009) used data from the PRESIDE study, which collected responses from more than 31,000 women in the United States, to test for correlates of sexual distress among women reporting low sexual desire. The sample used in this study was chosen to be representative of the U.S. population in terms of age, race, marital status, education, and income, maximizing the generalizability of the findings. Sexual desire was measured using a single item: "How often to you desire to engage in sexual activity?" Women who responded with "never" or "rarely" were categorized as having low sexual desire. Sexual distress was measured using the Female Sexual Distress Scale, a 13-item measure of personally related sexual distress (Derogatis, Rosen, Leiblum, Burnett, & Heiman, 2002). Women scoring above the clinical cutoff of 15 were categorized as sexually distressed. Rosen and colleagues found that, while older women tended to report low desire at higher rates than younger women, it was younger women who were most likely to be distressed by their low desire (especially women between the ages of 22 and 44 years). The high methodological quality of this study allowed Rosen and colleagues to confidently conclude that low sexual desire may be more distressing for younger women as compared with older women.

As noted by Rosen and colleagues (2009), there were a number of important implications of their findings. For example, the results help us understand which women may be most likely to seek treatment for low sexual desire (those most distressed by low desire, *i.e.*, younger women). Even more important, the findings have the potential to help clinicians identify when certain types of treatment may be most appropriate for women presenting with sexual difficulties. If older women are less likely to be distressed by low levels of desire than younger women with low desire, treatments that aim specifically at increasing levels of desire may be less appropriate or efficacious for older women. Alternatively, older women presenting with low sexual desire may benefit more from treatments that target other factors such as the overall relationship or other health problems.

The present study aimed to replicate and expand upon Rosen and colleague's important findings by examining whether age moderates the association between sexual desire and sexual distress. While Rosen's 2009 study showed that younger women with low sexual desire were more likely to report distress as compared with older women, explicitly testing the statistical interaction between desire and age in predicting distress (for women with and without low desire) would solidify the inference that age moderates

this association across the entire range of desire levels. To expand on previous findings, we tested personal sexual distress (i.e., frustration and worry pertaining to one's own sexual experience) and relational sexual distress (i.e., the extent to which sexual difficulties impact the sexual relationship) as independent outcomes. Rosen and colleagues focused exclusively on personal sexual distress as their outcome, however, it is also clinically relevant and important to examine the association between sexual desire and relational sexual distress. *DSM-IV-TR* criteria for sexual dysfunction explicitly acknowledge the importance of the relational context by including the interpersonal difficulty criterion in the definition of hypoactive sexual desire disorder. While personal and relational sexual distress are often closely related, a number of researchers have suggested that these factors should be measured separately (Lorenz, Stephenson, & Meston, 2011; Meston & Trappnell, 2005). In clinical practice, it is often the relational conflict and/or distress of the partner that drive women to seek treatment (and qualifies them for diagnosis) rather than personal subjective distress regarding their low sexual desire. As such, it is important to determine if the link between sexual desire and relational sexual distress is moderated by age in the same way as the link between desire and personal sexual distress.

We also measured sexual desire and sexual distress using multi-item measures and analyzed them as continuous variables. This method of measurement and analysis allowed us to take into account potential distinctions between *no* sexual desire and *very low* sexual desire (and, likewise, between moderate and extreme distress) which cannot be examined when the factors are viewed as dichotomous as was the case in Rosen et al.'s (2009) study. This analytic method also allowed us to test potential nonlinear associations and interactions between our factors, which is important given that the association between desire and distress may change in strength along the continuum of either variable.

OBJECTIVE

In sum, the objective of the present study was to expand upon the findings of Rosen and colleagues (2009) by testing whether age moderates the association between sexual desire and personal and relational distress in women. On the basis of the findings of Rosen and colleagues, we predicted that age would moderate this association such that desire and distress would be more strongly related in younger women as compared with older women.

METHOD

Participants and Procedure

Participants were drawn from a number of previously collected samples. Common characteristics across samples were that every participant reported

currently being in a heterosexual romantic relationship and having engaged in some form of sexual activity (coupled oral, manual, and/or genital stimulation/penetration) in the past month. Overall, the sample consisted of 771 women with a mean age of 27.77 years ($SD = 9.64$ years). The combined sample was 66.67% Caucasian and exhibited mid-to-high scores on measures of sexual desire and sexual distress (see the Measures section for ranges and scoring of scales and the Results section for means and standard deviations).

Sample 1

One hundred and thirty women were recruited to take part in a randomized clinical trial on the effectiveness of ginkgo biloba in treating female sexual arousal difficulties (Meston, Rellini, & Telch, 2008). Because these women were recruited with consideration that they were experiencing sexual difficulties and were interested in treatment, they exhibited relatively low scores on measures of sexual desire (see Table 1) and distress. For additional information on this sample, see Meston, Rellini, and Telch (2008).

Sample 2

Two hundred and forty three women were recruited for a study examining the affects of childhood sexual abuse on adult sexual schemas. Two distinct groups were recruited: one that reported some sexual difficulty ($n = 102$) and one that reported some sexual difficulty and a history of unwanted sexual contact before the age of 16 years ($n = 141$). These women were recruited on the basis of reporting a sexual difficulty,² but not on the basis of distress or treatment-seeking. As such, the sample exhibited midrange scores on measures of sexual desire and sexual distress (see Table 1). For additional information on this sample, see Stephenson et al. (in press).

Sample 3

One hundred and eighty women were recruited to test the discriminative validity of a measure of female sexual satisfaction and distress (Meston & Trapnell, 2005). Two distinct groups were recruited: one who met criteria for some form of female sexual dysfunction (hypoactive sexual desire disorder,

² Recent studies suggest that approximately 64% of women report a recurrent difficulty with sexual functioning in the past year (Hayes et al., 2006). As such, the women included in this sample represent a majority of women in the population, not those with severely impaired sexual functioning. It is not surprising that the sexual desire and distress of this sample fell within the normal range.

TABLE 1. Pearson's Correlations, Means, and Standard Deviations for All Study Variables

Variable	1	2	3	4	Combined sample		Sample 1		Sample 2		Sample 3		Sample 4	
					M	SD	M	SD	M	SD	M	SD	M	SD
1. Age	1	-.13***	-.18***	-.17***	27.76	9.64	28.21	7.88	33.53	10.89	28.95	8.61	20.25	2.33
2. Sexual desire		1	.31***	.39***	3.83	1.33	2.94	1.31	3.95	1.45	4.00	1.15	4.17	0.98
3. Personal sexual distress			1	.75***	19.93	7.75	15.88	4.93	17.61	7.83	19.72	7.41	26.22	5.62
4. Relational sexual distress				1	21.26	7.58	16.98	6.40	18.81	7.95	22.14	6.69	26.46	5.22

Note. The measures of personal and relational sexual distress are scored such that higher values indicate less distress (i.e., higher values indicate higher subjective well-being). Possible ranges for study variables are as follows: desire: 0–6; personal and relational sexual distress: 6–30.
 * $p < .05$. ** $p < .01$. *** $p < .001$.

female sexual arousal disorder, female orgasmic disorder, and/or dyspareunia; $n = 102$), and an age-matched control group who did not meet criteria for female sexual dysfunction ($n = 79$). These women were recruited to represent clinical and control populations. As such, they exhibited midrange scores on measures of sexual desire and sexual distress (see Table 1). For additional information on this sample, see Meston and Trapnell (2005).

Sample 4

Two hundred and eighteen undergraduate women participated in a study exploring the associations between sexual and relational factors. The only inclusion criteria were that they were currently in monogamous heterosexual relationships. As such, they exhibited mid-range scores on measures of sexual desire and sexual distress (see Table 1). For additional information on this sample, see Stephenson and Meston (2010b).

Measures

SEXUAL DISTRESS

The Sexual Satisfaction Scale for Women (Meston & Trapnell, 2005) is made up of 30 items assessing five unique domains of sexual satisfaction and has demonstrated high reliability and validity (Meston & Trapnell, 2005). The Sexual Satisfaction Scale for Women includes subscales assessing overall satisfaction with one's sex life (contentment) and personal and relational sexual distress regarding sexual difficulties. The present study used the personal concern and relational concern subscales as outcomes. Each subscale consists of six items that are reverse coded and summed so that higher scores indicate less distress (higher well-being). Scores for each subscale range from 6 (*very high distress*) to 30 (*no distress*). The personal concern subscale includes items such as "I'm so distressed about my sexual difficulties that it affects the way I feel about myself" and has a reported Cronbach's alpha of .90. The relational concern subscale includes items such as "I'm worried that my sexual difficulties will adversely affect my relationship" and has a reported Cronbach's alpha of .88.

SEXUAL DESIRE

Sexual desire was assessed using the Sexual Desire subscale of the Female Sexual Function Index (Rosen et al., 2000), which is a 19-item measure of female sexual function. The Female Sexual Function Index has demonstrated excellent reliability and validity in clinical and nonclinical samples (Meston, 2003). The desire subscale consists of two items with higher scores indicating

more frequent sexual desire and a higher overall level of sexual desire. Scores range from 1 (*no desire*) to 6 (*very high desire*). The desire subscale has been validated independently of the full Female Sexual Function Index as a measure of desire difficulties in women and a score of 3 on the desire scale has been established as a maximally sensitive and specific clinical cutoff score for hypoactive sexual desire disorder (Gerstenberger et al., 2010). Means and standard deviations for all continuous measures used in the present study can be found in Table 1.

RESULTS

Associations Between Sexual Desire and Sexual Distress

We began by examining the strength of the relation among age, sexual desire ($M = 3.83$, $SD = 1.33$), and sexual distress (personal distress: $M = 19.93$, $SD = 7.75$; relational distress: $M = 21.26$, $SD = 7.58$) for the sample as a whole. All factors were significantly correlated with each other (see Table 1). In particular, older age was associated with lower desire and higher distress and lower desire was associated with higher personal and relational distress.

Age as a Moderator

PERSONAL DISTRESS

We constructed an initial linear regression model with personal sexual distress regressed on age, sexual desire, squared terms of age and desire, and linear and quadratic interactions between age and desire. We then removed nonsignificant higher order interaction terms, using both significance tests and the Akaike information criterion to guide our choice of removal. The final model (the model with the lowest Akaike information criterion that included all constituent components of significant higher order interactions) included sexual desire, age, a squared age term, a linear interaction between age and desire, and an interaction between age squared and sexual desire as predictors. The overall model was significant, $R^2 = .17$, $F(5, 596) = 24.33$, $p < .001$, as was the highest order interaction term, $\text{Age}^2 \times \text{Desire}$, $t = 2.67$, $p < .01$ (see Table 2 and Figure 1).

RELATIONAL DISTRESS

We followed the same analytic method using relational sexual distress as an outcome. The final model (that with the lowest Akaike information criterion that included all constituent components of significant higher order interactions) included sexual desire, a sexual desire squared term, age, a squared age term, a linear interaction between age and desire, and an interaction

TABLE 2. Model for Age as a Moderator of the Association Between Sexual Desire and Personal Sexual Distress

Outcome predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>F</i>	<i>R</i> ²
Outcome: sexual distress				24.33***	.17
Sexual desire	8.59	2.39	3.59***		
Age	0.31	0.56	0.56		
Age ²	-0.01	0.01	-0.58		
Age × Desire	-0.42	0.15	-2.83**		
Age ² × Desire	0.01	0.01	2.67**		

* $p < .05$. ** $p < .01$. *** $p < .001$.

between age squared and sexual desire. The overall model was significant, $R^2 = .24$, $F(6, 617) = 32.14$, $p < .001$, and the highest order interaction term was marginally significant, $\text{Age}^2 \times \text{Desire}$, $t = 1.89$, $p = .058$ (see Table 3 and Figure 2).

DISCUSSION

Our results suggest that age is an important moderator of the relation between sexual desire and distress, and that this moderation is somewhat complex. In particular, age interacted quadratically with desire in predicting personal and relational sexual distress such that the association between sexual desire and sexual distress was consistently moderate over high and mid

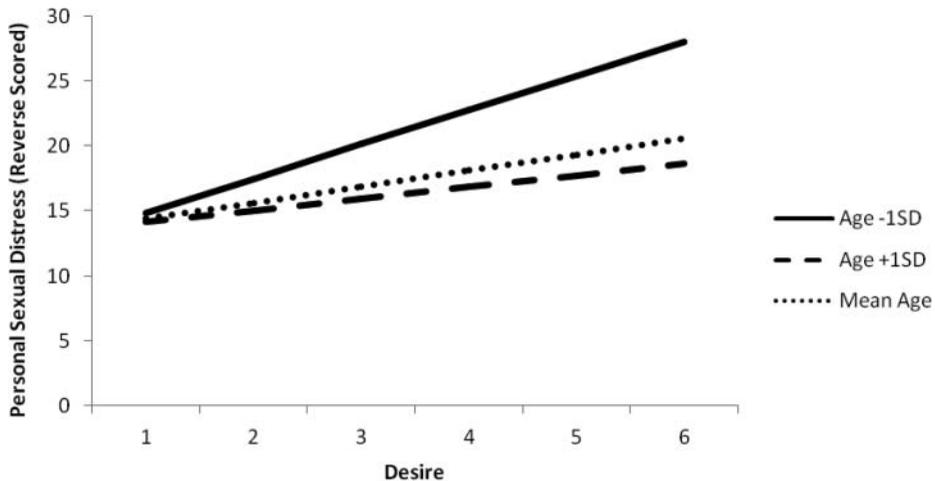


FIGURE 1. Age as a moderator of the association between sexual desire and personal sexual distress. The measure of Personal Sexual Distress is scored such that higher values indicate less distress (i.e., higher values indicate higher subjective well-being). $-1\ SD$ age = 18.12, M age = 27.76, $+1\ SD$ age = 37.4.

TABLE 3. Model for Age as a Moderator of the Association Between Sexual Desire and Relational Sexual Distress

Outcome predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>F</i>	<i>R</i> ²
Outcome: sexual distress				32.14***	.23
Sexual desire	12.61	2.68	4.71***		
Sexual desire ²	-0.70	0.14	-4.89***		
Age	0.17	0.58	0.28		
Age ²	-0.01	0.01	-0.22		
Age × Desire	-0.32	0.15	-2.08*		
Age ² × Desire	0.1	0.01	1.89+		

+*p* = .058. **p* < .05. ***p* < .01. ****p* < .001.

age ranges, and strengthened exponentially among younger age ranges. In other words, the association between desire and distress was much stronger for the youngest women than it was for middle-aged or older women. Our two statistical models, using personal sexual distress and relational sexual distress respectively as outcomes, were very similar. The primary difference between the two was that the model for relational distress included a quadratic desire term. Figure 2 shows the inclusion of this term changed the shape of the association between desire and relational distress such that the two factors were weakly related at high and middle ranges of desire, before becoming much more strongly related at the lowest levels of desire.

In general, these findings mirror those of Rosen and colleagues (2009) in that younger women exhibited a stronger association between desire and

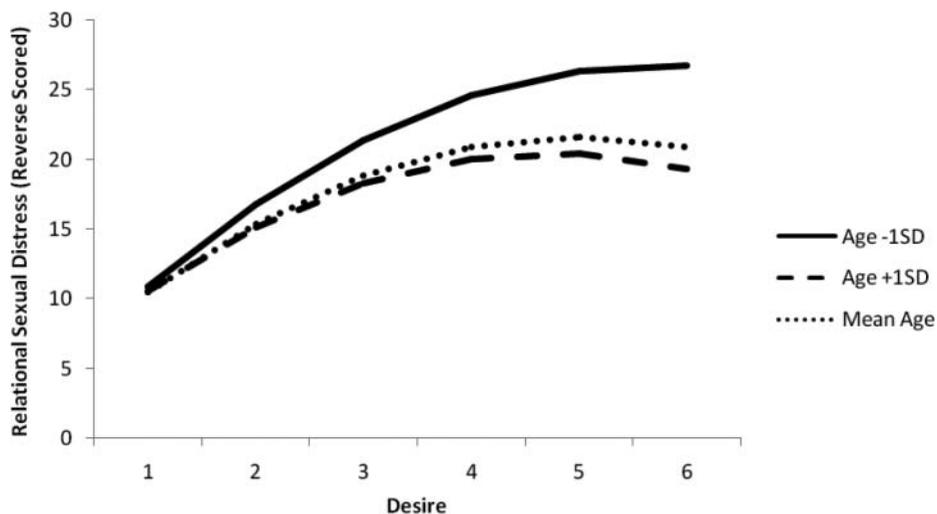


FIGURE 2. Age as a moderator of the association between sexual desire and relational sexual distress. The measure of Relational Sexual Distress is scored such that higher values indicate less distress (i.e., higher values indicate higher subjective well-being). -1 *SD* age = 18.12, *M* age = 27.76, $+1$ *SD* age = 37.4.

distress as compared with older women. However, our findings diverged somewhat in two important ways. First, in our sample, the strength of association between desire and distress strengthened continuously with decreasing age. In Rosen and colleagues' (2009) study, the strength of the association between desire and distress peaked in young adulthood (ages 25–30 years) and was slightly weaker for the youngest women in their sample (ages 18–25 years). Second, in the present study very low levels of sexual desire were associated with similar levels of distress across all ages; it was the degree of change in distress levels as desire levels rose that differed between ages. In other words, very low desire was associated with relatively high levels of distress for everyone on average, however, high levels of desire were associated with less distress for younger women, as compared with older and middle-aged women.

There are a number of potential reasons as to why the present findings differ slightly from those of Rosen and colleagues (2009). First, the characteristics of our sample differed from those of Rosen's sample. Whereas Rosen and colleagues (2009) included many single women (proportional to the U.S. population), our sample included only women in relationships. This difference in sample makeup could potentially account for the differences in comparisons of late-adolescent to young adult women. For example, in Rosen's study (2009), 25–34-year-old women exhibited a stronger association between desire and distress than did 18–25-year-old women, whereas we found the opposite pattern in the present study. It is possible that, in the present study, the younger women exhibited stronger associations between sexual desire and distress because of differences in how issues of low desire are managed in relationships (e.g., younger women may not experience as much partner support as older women), an effect which may not manifest as strongly in a sample with many single women.

In addition, the present sample included a higher percentage of women who met criteria for sexual dysfunction and, thus, included a higher percentage of women reporting low sexual desire as compared with Rosen's sample (2009). While this characteristic of our sample limited the generalizability of the findings to the U.S. population at large, it provided for more representation of the lower ranges of sexual desire and distress measures. A common difficulty in studying measures of subjective well-being, and one reason that logistic regression is often used, is the restricted range of the outcome created by ceiling effects. However, in the present study, the full range of sexual distress was well represented, allowing us to use linear regression without the violation of model assumptions that would typically occur with the severely skewed distribution of distress found in the general population (Stephenson & Meston, 2010a).

Last, our analytic method measured how distressed women were, rather than whether or not they were distressed. Predicting an individual's level of distress is qualitatively and quantitatively different from predicting whether

she is distressed or not. For example, labeling one's self as either distressed or nondistressed regarding one's low sexual desire may involve drawing a comparison to how distressed one would be in the context of high levels of desire. For older women, the difference in level of distress in the context of high or low sexual desire may be quite small and, thus, they may be more likely to label themselves as "nondistressed" in the context of low desire. However, for younger women, their distress level in the context of low desire seems to differ greatly from their levels of distress in the context of high sexual desire, potentially making them more likely to label themselves as "distressed." In other words, deciding whether one is distressed as a result of low sexual functioning may involve a mental comparison to one's predicted level of distress if the impaired functioning were to be ameliorated. A similar argument could be made for measuring sexual desire—reporting one's level of desire for sex is potentially a very different task than reporting the presence or absence of "low" desire. While outlining the differences that may result from these two forms of measurement is beyond the scope of the present study, our results do point to the need for multiple methods of assessing complex constructs such as sexual desire and distress before drawing firm conclusions as to the nature of their relationship.

The present study had a number of limitations, primarily surrounding the makeup of the sample. While our combined sample exhibited a wide age range, women over the age of 50 were poorly represented ($n = 28$) and women younger than 21 years of age were overrepresented ($n = 107$). In addition, as previously mentioned, our sample included only sexually active women in heterosexual relationships. It would be informative for future research to make a formal comparison between women in and out of romantic relationships, and between heterosexual and homosexual/bisexual women, in regards to their sexual functioning, sexual distress, and the relationship between these two factors. Also, we oversampled women who met diagnostic criteria for female sexual dysfunction. While this oversampling assured sufficient variability in our measures, it limits the generalizability of the findings. In particular, the present findings may be more aptly applicable to women reporting sexual difficulties rather than the general population of women. Last, we had an underrepresentation of young women with established clinical diagnoses and it will be important to more fully sample this population in future studies.

Despite these limitations, the present findings have a number of implications for research and practice. First, the complex nature of the interactions presented here highlights the need to move beyond the examination of simple linear relationships between factors in the field of sexuality research. Factors such as sexual desire and distress are multifaceted constructs that exist in complex personal and social environments and, as such, they will likely interact in nuanced ways that would be missed by traditional analytic methods. In terms of clinical practice, our results and those of Rosen

and colleagues (2009) suggest that increasing levels of desire may have a smaller impact on distress levels for older women as compared with younger women. This age difference could stem from a number of factors including women's expectations regarding sexual desire as they age, the sexual desire of their relational partners, and/or cohort effects reflecting changes in media and cultural representations of female sexuality. Regardless, the findings highlight the importance of treatment planning and discussing with clients whether raising levels of sexual functioning alone would result in the largest gains in subjective well-being, or whether addressing contextual relational or personal issues concurrently may be warranted.

In sum, the present study generally mirrored the findings of Rosen et al. (2009) that desire is more closely related to sexual distress for young women as compared older women using different assessment and analytic methods. We also established that the association between sexual desire and relational sexual distress is similarly moderated by age and that the interaction between desire and age in predicting distress is somewhat complex, including nonlinear associations. These findings increase our confidence in the conclusion that it is essential to consider age and other factors when examining the complex link between sexual functioning and the subjective well-being of women and when determining when different types of sexually relevant interventions may or may not be most appropriate.

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